Oct. 16, 1951 R. P. VUILLEMENOT 2,571,504

THERMOPLASTIC SPRAY BOTTLE

Filed Sept. 16, 1949

Fig. 1

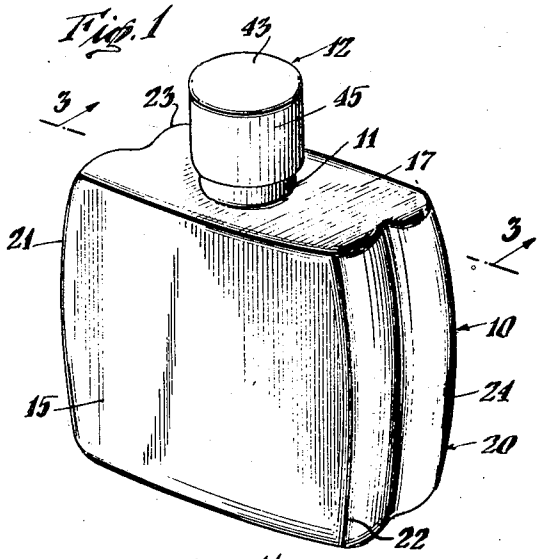


Fig. 2

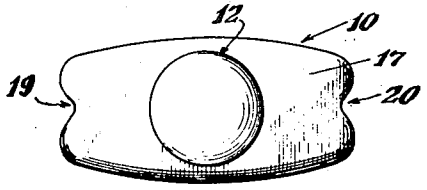


Fig. 4

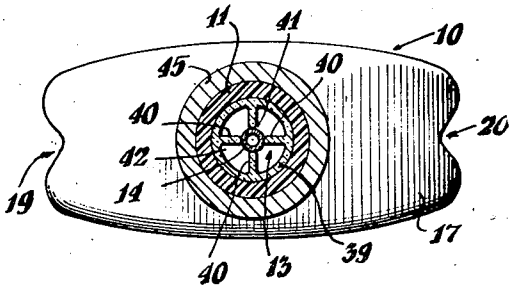


Fig. 3

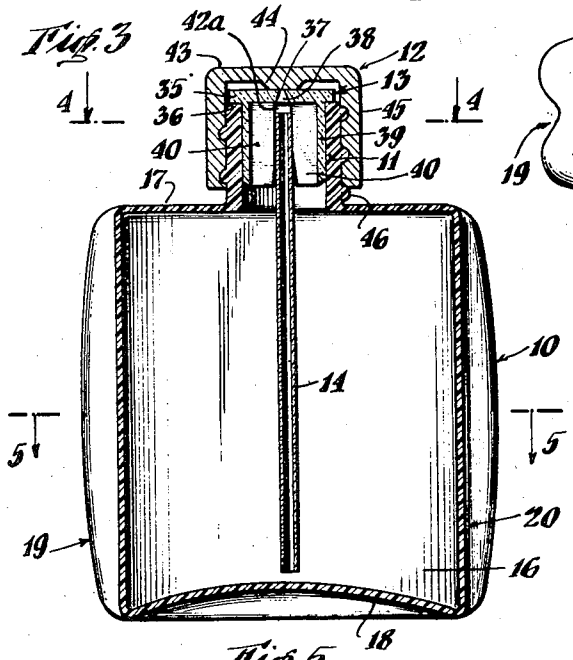


Fig. 5

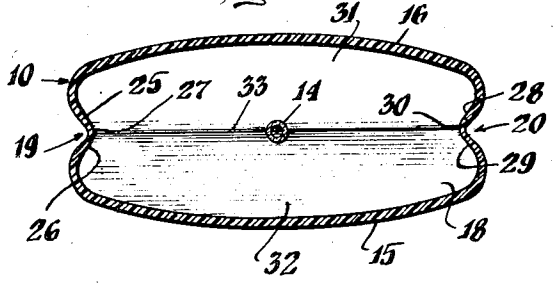
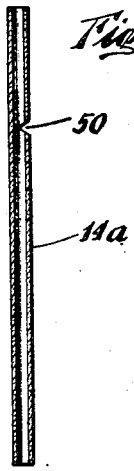


Fig. 6



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THERMOPLASTIC SPRAY BOTTLE

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2 Claims. (Cl. 299—90)

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This invention relates to a bottle formed from thermoplastic material and more particularly to a bottle to dispense liquid contents, in the form of a spray or mist in the manner of an atomizer.

The invention provides a bottle made of a thermoplastic material, the body portion of which is designed to produce a bellows effect when squeezed, thereby facilitating its use as a dispensing atomizer, this effect being enhanced by the provision of re-entrant side walls to form oppositely disposed accordion pleats, one such accordion pleat extending along each side of the body of the bottle.

Although the novel features which are believed to be characteristic of the invention will be pointed out in the annexed claims, the invention itself as to its objects and advantages and the manner in which it may be carried out may be better understood by reference to the following description taken in connection with the accompanying drawings forming a part hereof, in which:

Fig. 1 is a view in perspective of a bottle embodying the invention; and

Fig. 2 is a top plan view of the bottle shown in Fig. 1; and

Fig. 3 is a view in cross-section on line 3—3 of Fig. 1; and

Fig. 4 is a view in cross-section on line 4—4 of Fig. 3; and

Fig. 5 is a view on line 5—5 of Fig. 3; and

Fig. 6 is a view in elevation of a modified form of tube for a spray head.

Referring now to the drawings in which like reference characters denote like parts throughout the several views, the bottle, as shown, comprises in general a body portion 10, having a neck portion 11, a closure cap 12, a spray head 13 and a tube 14. These several parts are molded, on molding machines, from thermoplastic material.

The body portion 10 is made of a thermoplastic that is pliable or flexible at ordinary temperatures, such, for example, as polyethylene. Particular attention is directed to the particular shape and formation of the body portion of the bottle. It comprises front and back walls 15 and 16 of generally square or rectangular shape, a top wall 17, a bottom wall 18, and side walls 19 and 20. It is clear, of course, that the neck 11 extends upwardly from the top wall 17. It will be noted that the vertical edges 21, 22, 23, and 24, at the corners of the body portion are slightly curved so that the front and back walls 15 and 16 are widest about midway between the top and bottom walls of the body portion. The side walls

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19 and 20 of the body portion are in the form of a re-entrant angle; that is, as shown perhaps most clearly in Fig. 5, side wall 19 comprises an inwardly extending portion 25 from the corner of back wall 16 and an inwardly extending portion 26 from the corner of front wall 15. These re-entrant side wall portions 25 and 26 meet at apex 27 extending toward the tube 14. Re-entrant portions 28 and 29 of side wall 20 meet at apex 30 extending toward tube 14. As shown, the bottom wall has re-entrant portions 31 and 32 meeting at apex 33 extending toward the interior of the bottle. However, the re-entrant angle is less sharp than the re-entrant angles of the side walls. Preferably, the front and back walls 15 and 16 are made of a greater thickness than the re-entrant side walls.

From the foregoing, it will be seen that the side walls provide what may be called an "accordion pleat" down the sides of the bottle. When a force is applied to the front and back walls 15 and 16 toward the interior of the bottle, as by squeezing these walls between the thumb and fingers, the accordion pleats flex readily and deform to decrease the interior volume of the bottle, and when the pressure is released the walls readily return to their normal position and the bottle reverts to its normal volume.

The bottle is admirably suited for liquid cosmetics such as liquid deodorants as it lends itself to use with a spray head which may be inserted in the neck of the bottle thus to form a dispenser which may be used as an atomizer for discharging the liquid deodorant from the bottle in the form of puffs of mist.

As shown, the spray head 13 comprises a single piece of molded, thermoplastic material and includes a top plate 35 having an annular shoulder 36 lying on the rim of the neck portion 11 of the bottle. Centrally of the top plate 35, there is, at the outer surface, a pinhole 37 which expands downwardly, providing a chamber 38 in the form of a frustum of a cone. A circular skirt 39 extends downwardly from top plate 35 and engages, in a pressed fit, the inner surface of the neck 11 of the bottle. Extending radially from the skirt 39 are a number of baffle portions 40, circumferentially spaced around the interior of the skirts. Baffles 40 terminate short of the axis of the skirt, thus providing a central opening 41 into which is inserted the upper end of the small diameter tube 14 also made of thermoplastic material. The inner ends of baffles 40 forming the central opening 41 are tapered outwardly in a downward direction so that on insertion of the tube 14 it may be pressed

upwardly to insure a gripping action on the tube to keep it in place, it being noted that the upper open end of the tube 14 terminates short of the undersurface of top plate 35, to provide passageways 42a from passageways 42 between baffles 40 into the central opening 41 which communicate with chamber 38 in the spray head. The tube 14 extends downwardly into the interior of the bottle, its lower open end terminating short of the bottom wall 32 of the body portion 10 of the bottle. The removable closure cap 12 comprises a cap plate 43 having a downwardly projecting central lug 44 to engage top plate 35 of the spray head to seal the pinhole 37 and a depending circular skirt 45. This skirt is internally threaded providing a female thread to engage the external thread 46 on the outside of the neck 11 of the bottle so that the closure cap 12 may be screwed on the neck of the bottle or unscrewed and removed therefrom.

The bottle, as will be seen from the foregoing description is particularly useful as a dispenser of liquid deodorant. Assuming that the bottle contains such a liquid deodorant and the closure cap is removed, it then serves as an atomizer to discharge the liquid in puffs of deodorant mist. Upon successive squeezes of the bottle by pressing the front and back walls 15 and 16, the liquid is discharged through the pinhole 37 in little puffs of mist or spray. When the walls 15 and 16 are squeezed between the thumb and fingers, for example, the air in the bottle above the surface of the liquid is compressed, it having been noted above that the re-entrant side walls 19 and 20 flex readily along the accordion pleats. The compressed air exerts a pressure on the surface of the liquid and the liquid rises in the tube 14 and is forced out the upper open end of tube 14. Meantime the air pressure forces air up through passageways 42 between the baffles 40 in the spray head. This air passes through passageways 42a into the central opening 41 of the spray head which communicates with chamber 38. The moving current of air atomizes the liquid discharged from the upper end of tube 14 and forces it out of pinhole 37 in a puff of mist. Upon release of the inward pressure on walls 15 and 16, the walls of the bottle return to their normal position, drawing in sufficient air through the pinhole to replace the air forced out by the prior squeeze. Successive puffs of deodorant mist may be discharged from the bottle on rapid successive squeezes of the bottle. Thus the bottle serves as a bellows container.

While a particular type of spray head has been described, it will be understood that the bellows bottle described lends itself to be used with other types of spray head which may be inserted in the neck. For example, in some instances and for some liquids a suitable spray head may be provided by providing a V-shaped notch through the wall of the tube 14 above the surface of the liquid in the bottle and then locating the tube so that its upper end engages the interior side walls of chamber 38 with a press fit. In this case baffles 40 may be dispensed with, if desired, as passageways 42 are not then necessary. Such a tube 14a is shown in Fig. 6, a V-shaped notch 50 being provided in the wall of the tube with its apex toward the interior of the tube. The notch must be above the surface of the liquid in the bottle. With this type of tube, on squeezing the bottle as described above, the compressed air above the surface of the liquid forces the liquid

upwardly in tube 14a to notch 50. Meantime the compressed air causes a current to flow through the notch upwardly through the tube 14a. This atomizes the liquid flowing past the notch and discharges it from the upper end of the tube as a spray.

The terms and expressions which have been employed herein are used as terms of description and not of limitation and there is no intention in the use of such terms and expressions of excluding any equivalent of the features shown and described or portions thereof, but it is recognized that various modifications are possible within the scope of invention claimed.

What is claimed is:

1. A thermoplastic bottle for liquid cosmetic such as liquid deodorant serving as a dispenser of the liquid contained in the bottle as a spray in the manner of an atomizer which comprises, a body portion having front and back walls of generally rectangular shape, a bottom wall, a top wall having a hollow neck and flexible re-entrant side walls, said side walls joining said front and back walls, and said re-entrant walls having their apices pointing toward the interior of said body portion, said flexible re-entrant walls forming accordion pleats which flex and deform from normal position to decrease the volume of said body portion when pressure is exerted on said back and front walls by squeezing and which return to their normal position upon release of said pressure to revert the body portion to its normal volume, an atomizer head in said neck having a top plate with a pinhole located centrally thereof and a communicating chamber, a skirt press-fitted into said hollow neck, a plurality of baffles extending inwardly from said skirt and terminating short of the axis of said neck to form a central opening, a tube in said body portion, the upper end of which is press-fitted in said central opening and which terminates below said chamber and the lower end of which terminates near said bottom wall, said baffles providing passageway for air from the interior of said body portion into said chamber, said bottle dispensing liquid contained therein through said pinhole in puffs of mist in response to successive squeezes of said bottle.

2. A thermoplastic bottle for liquid cosmetic such as liquid deodorant serving as a dispenser of the liquid contained in the bottle as a spray in the manner of an atomizer which comprises, a body portion having front and back walls of generally rectangular shape, a top wall having a hollow neck, flexible re-entrant side walls and re-entrant bottom wall, said re-entrant bottom and side walls joining said front and back walls, and said re-entrant walls having their apices pointing toward the interior of said body portion notwithstanding hydrostatic pressure exerted by liquid contained in said bottle, said flexible re-entrant walls forming accordion pleats which flex and deform to decrease the volume of said body portion when manual pressure is exerted on said back and front walls by squeezing and which return to their normal position upon release of said manual pressure to revert the body portion to its normal volume, an atomizer head in said neck having a top plate with a pinhole located centrally thereof and a communicating chamber, a skirt press-fitted into said hollow neck, a plurality of baffles extending inwardly from said skirt and terminating short of the axis of said neck to form a central opening, a tube in said body portion, the upper end of which is

press-fitted in said central opening and which terminates below said chamber and the lower end of which terminates near said bottom wall, said baffles providing passageway for air from the interior of said body portion into said chamber, said bottle dispensing liquid contained therein through said pinhole in puffs of mist in response to successive squeezes of said bottle.

ROBERT P. VUILLEMENOT.

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